

Gamma Ray Burst Discoveries by the Swift Mission

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Gamma-ray bursts are among the most fascinating occurrences in the cosmos. They are thought to be the birth cries of black holes throughout the universe. The NASA Swift mission is an innovative new multiwavelength observatory designed to determine the origin of bursts and use them to probe the early Universe. Swift is now in orbit since November 20, 2004 and all hardware is performing well. A new-technology wide-field gamma-ray camera is detecting a hundred bursts per year. Sensitive narrow-field X-ray and UV/optical telescopes, built in collaboration with UK and Italian partners, are pointed at the burst location in 50-100 sec by an autonomously controlled "swift" spacecraft. For each burst, arcsec positions are determined and optical/UV/X-ray/gamma-ray spectrophotometry performed. Information is also rapidly sent to the ground to a team of more than 50 observers at telescopes around the world. The first year of findings from the mission will be presented. There has been a break-through in the long-standing mystery of short GRBs; they appear to be caused by merging neutron stars. High redshift bursts have been detected leading to a better understanding of star formation rates and distant galaxy environments. GRBs have been found with giant X-ray flares occurring in their afterglow.

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